

The Evolution of Mathematics-Teachers' Community-of-Practice

Nitsa Movshovitz-Hadar and Atara Shriki

Aim and Rationale

A successful implementation of educational change depends on teachers' professional development, and their ability to translate innovative ideas into practice. Although teaching, by its very nature, is a complex practice, most teachers work in isolation, making their own planning and decisions, and solve pedagogical problems having limited consultation with and feedback from their colleagues. The past decade has seen increasing demand to improve school mathematics, which, as a result, generated a need for teachers to join forces and share individual knowledge and experience with the community. Thus, the need to nurture mathematics teachers' communities of practice became a primary goal.

Wenger (1998), who coined the term "community of practice" (CoP), maintains that in order for a community to be recognized as a CoP, a combination of three characteristics, cultivated in parallel, is necessary: (i) The domain: A CoP is identified by a common domain of interest; (ii) The community: A CoP consists of members who are engaged in joint activities and discussions, help each other, share information, and build relationships that enable them to learn from one other; (iii) The practice: Members of a CoP are practitioners. They develop a shared repertoire of resources, such as experiences, stories, tools, and ways of addressing recurring problems, thus learn with and from each other. In general, national communities of mathematics teachers conform to Wegner's first two characteristics: they definitely share an interest in mathematics, its teaching and learning, meet in professional

Organizers Co-chair: Nitsa Movshovitz-Hadar (Israel), Atara Shriki, (Israel); Team Members: Diane Resek (USA), Barbara Clarke (Australia), Jiansheng Bao (China); Liaison IPC Member: Gabriele Kaiser (Germany).

N. Movshovitz-Hadar (✉) · A. Shriki
Technion Israel Institute of Technology, Haifa, Israel
e-mail: nitsa@technion.ac.il

conferences, read professional journals, and share a professional jargon enabling them to learn from one another. However, the third characteristic, to a large extent, is still missing in many communities of mathematics teachers, as only few develop a shared repertoire of resources. Even those communities of mathematics teachers who do develop such resources usually count on leaders of the community to put them together for the benefit of the entire community.

In light of the above, DG4 focused on issues related to the formation of a mathematics teachers' CoP (MTCoP) and their on-going handling from both theoretical and practical points of view.

Session 1: Triggers and Needs for CoPs to Be Formed—Theory and Practice

Following a short introduction that presented views from three continents (Barbara Clarke, Australia; Jiansheng Bao, China; Diane Resek, USA) participants were asked to share experiences and promising practices, and to consider the following questions in small groups:

- What triggers and needs for CoPs to be formed, can you identify based upon your own experiences/beliefs/research?
- Who are the initiators and what are their drivers?

In as much as possible, please anchor your perceptions in a theoretical framework.

The following are some of the issues and challenges identified during the discussion:

- Arriving at shared goals for the purpose of teaching, defining problems of teaching, and agreeing on problem definitions/boundaries is not a simple process, but no doubt challenging;
- Sometimes groups are dysfunctional and there are some features to be wary of in groups: For example, blaming the student rather than taking personal responsibility;
- It can be challenging to develop a genuine CoP due to norms of privacy being evident in many schooling cultures. For example: reluctance to 'open the classroom door' to other teachers;
- Getting teachers to focus on results of their change of practice versus just doing activities should be at the heart of working with MTCoPs;
- Leadership, trust, sustainability, and quality of relationships are required for an effective community of practice. These issues raise questions regarding who should lead and run a CoP (School teachers? University professors? Researchers? Consultants?), and how the nature of leadership effects the commitment and sustainability of the group;

- The community needs to continue learning, which may require redirection. Systemic support can be effective when it establishes a culture of professional collaboration with appropriate expertise.

Session 2: Forming, Running and Sustaining an Effective MTCoP

Following a short introductory presentation (Atara Shriki and Nitsa Movshowitz-Hadar, Israel), three subgroups were formed focusing on three themes that emerged from the first session:

- Forming and running of MTCoP: Bottom up versus top-down models;
- Collective efficacy: How do we build mutual trust, sense of belonging and ownership;
- Sustainability of MTCoP.

In relating to these questions, participants were asked to provide concrete examples from their previous experience. Since it turned out that participants observed reciprocal connections between forming and running of MTCoP and its sustainability, we present these concerns together.

The following is a brief summary of the issues discussed:

Forming, running and sustaining MTCoPs. The design of professional development programs is mostly 'top down', done by teacher educators who are not necessarily members of the MTCoP to whom the program is targeted. The designers of such programs hardly ever ask teachers for their urgent needs and spend time responding to them. This might be one of the reasons for the unsustainability of most MTCoPs. Therefore, the question is what should be done in order to nurture these CoPs as independent groups that keep developing professionally without external assistance. It is also assumed that sustainability is dependent on the initial motivation for the group and whether it was internally or externally initiated. Namely, the sustainability of a MTCoP is directly affected by the driving force of the community. There has to be a desire (whether intrinsic or external) to change, to learn, and to transform. Some further related questions are: How to bring teachers to acknowledge the need to change their practice? What would teachers consider as change? How can teachers develop their ability to reflect on their change of practice?

Trust and Efficacy. Tensions exist in a functioning MTCoP. Although these are not bad, they need to be managed productively to move the group forward. One needs conflict to make changes, but also needs to build a rapport. There can be tensions between leadership and the ownership of participants, and tensions between making meetings compulsory versus having voluntary participation. Thus, it is necessary to be aware of these possible tensions, and discuss them openly with teachers.

Conclusion

DG4 provided an opportunity for productive dialogue and sharing of experiences from a range of contexts and countries. There are many positive experiences and experiential knowledge that need to be shared. We hope to continue these conversations into the future.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution Noncommercial License, which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

Reference

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge, UK: Cambridge University Press.